Health Policy and Technology 9 (2020) 430–446

Contents lists available at ScienceDirect

Health Policy and Technology

journal homepage: www.elsevier.com/locate/hlpt

An analysis of the policy responses to the COVID-19 pandemic in France, Belgium, and Canada

Zachary Desson[a], Emmi Weller[b], Peter McMeekin[c,f,*], Mehdi Ammi[d,e]

[a] Erasmus University Rotterdam, the Netherlands
[b] University of Oslo, Norway
[c] Northumbria University, Coach Lane Campus, Newcastle upon Tyne, NE7 7AX, UK
[d] Carleton University, Canada
[e] University of Queensland, Australia
[f] University of Glasgow, UK

ARTICLE INFO

Article history:
Available online 5 September 2020

Key Words:
Covid-19
Pandemic
Health
Policy

ABSTRACT

Objectives: This paper presents an overview and comparative analysis of the epidemiological situation and the policy responses in France, Belgium, and Canada during the early stages of the 2020 Covid-19 pandemic (Feb.-Aug. 2020). These three countries are compared because they represent a spectrum of different governance structures while also being OECD nations that are similar in many other respects.

Methods: A rapid review of primary data from the three countries was conducted. Data was collected from official government documents whenever possible, supplemented by information from international databases and local media reports. The data was then analysed to identify common patterns as well as significant divergences across the three countries, especially in the areas of health policy and technology use.

Results: France, Belgium and Canada faced differing epidemiological situations during the Covid-19 pandemic, and the wide variety of policy actions taken appears to be linked to existing governance and healthcare structures. The varying degrees of federalism and regional autonomy across the three countries highlight the different constraints faced by national policy-makers within different governance models.

Conclusions: The actions taken by all three countries appear to have been largely dictated by existing health system capacity, with increasing federalism associated with more fragmented strategies and less coordination across jurisdictions. However, the implications of certain policies related to economic resilience and health system capacity cannot yet be fully evaluated and may even prove to have net negative impacts into the future.

Introduction

As Covid-19 continues to impact societies in multiple ways, understanding how different governance regimes addressed the challenges of this pandemic may yield lessons for policymakers who continue to manage the economic, physical, mental and behavioural health consequences of this disease using a constantly evolving evidence base. While several reports, policy trackers, preprints and working papers exist on Covid-19 beyond what could be summarized in one single article, the non-biomedical peer-reviewed literature is much more limited, with policy papers exploring questions of political polarization [1], public involvement or the effects of social distancing [2]. A comparison of differences in governance regimes and population concentrations could be critical to improve our understanding of how and why different policies or technologies have been used to tackle Covid-19, and start to reflect on their economic implications. To our knowledge, no such academic paper exists.

In an effort to fill this gap in the literature, we propose a comparative analysis of France, Belgium and Canada. These three countries offer a spectrum across modes of governance and population density, while also being sufficiently similar to allow for useful comparisons to be drawn between them. To this end, we first provide a comprehensive picture of the pandemic in these three coun-

* Corresponding author.
E-mail addresses: peter.mcmeekin@northumbria.ac.uk, peter.mcmeekin@northumbria.ac.uk (P. McMeekin).

https://doi.org/10.1016/j.hlpt.2020.09.002

Table 1
Demographic Data Relevant to the impact of Covid-19 in France, Belgium, and Canada.

	France	Belgium	Canada
Government Type [7]	Semi-presidential republic	Federal parliamentary democracy under a constitutional monarchy	Federal parliamentary democracy under a constitutional monarchy
Regional Organization	13 regions, 5 overseas department and regions, and 7 overseas territories	3 regions (Flemish Region, Brussels Capital Region and Walloon Region) & 3 linguistic communities (Flemish, French and German)	10 Provinces (sovereign in Constitutionally agreed areas) and 3 Territories (directly dependant from the Federal level)
Population (million)	67.0 [8]	11.4 [9]	37 (Canada): 14.5 (Ontario): 8.5 (Quebec): 5 (British Columbia) [10]
Population density per km²	104.9 [8]	991 [9]	4 [10]
% Pop. above 65	19.3 [9]	19.1 [10]	17 [10]
Life expectancy at birth (years)	82.65 (total): 85.6 (female): 79.7 (male) [8]	81.5 (total): 83.7 (female): 79.2 (male) [11]	81.95 (total): 84 (female): 79.9 (male) [10]
GDP/Capita (€)	31 200 [9]	35 900 [12]	28 055 [10]
Unemployment rate prior to Covid-19 (%) [13]	8.2	5.2	6.3
Prevalence of Chronic Conditions (% of total deaths): [14]			
Diabetes	2	2	3
Cardiovascular Diseases	28	30	27
Respiratory Diseases	4	7	7
Obesity Prevalence (% of population considered obese, 2016) [7]	21.6	22.1	29.4
Alcohol Consumption (liters of pure alcohol per capita 2016) [10]	12.6	12.1	8.9
Tobacco Use (% of adult population smoking)	25 [9]	15 [9]	15.8 [15]

tries, followed by an analysis of the different policy actions taken by each country in response to the Covid-19 pandemic. Within this analysis, particular focus is given to the ways in which technology was harnessed to assist with the implementation of various policy objectives, with technology being defined as any new process, system or device, digital or otherwise, that is employed to improve health or social outcomes. We then further explore each country's responses using a detailed overview of their individual healthcare system responses and economic policies and how they differ according to existing governance structures.

Overview of France, Belgium & Canada

As founding members of "la Francophonie", the international organization for the French language, France, Belgium and Canada share obvious linguistic ties that have fostered historically close economic and diplomatic relationships. The primarily French-speaking province of Québec in Canada and the region of Wallonia in Belgium are especially interlinked with metropolitan France. Although Canada and Belgium both have wider English and Flemish-speaking communities outside of these areas, their common threads with France, including deep trade relationships, provide a backdrop for examining the nature of the Covid-19 outbreak in each of the three countries [3,4].

Apart from these similarities the three countries also have substantial differences, especially in terms of governance and demography, that create an interesting backdrop for comparative policy analysis (Table 1). France has the largest population by a significant margin, with highly centralized government institutions and only limited delegation to the regions, including within the healthcare sector [5]. Belgium is by far the smallest of the three both in terms of population and land mass, and operates under a federal governance structure that gives substantial responsibilities to the various regional governments, although healthcare provision mainly remains under the purview of the central government [6]. Canada, with a much larger land mass, has more defined divisions of power between federal and provincial governments, with the provinces administering the vast majority of public services including healthcare [6]. This gradient of governance, from almost fully centralized control in France to broad regional sovereignty in Canada, with Belgium in the centre, provides an excellent lens for comparison of each country's policy responses during the Covid-19 pandemic.

Adding nuance to the governance perspective, France, Belgium and Canada do share demographic similarities that might have predicted comparable health impacts from COVID-19, such as the proportion of the population over 65 years of age, overall life expectancy, or the rates of many chronic diseases. However, differences in respiratory disease rates and obesity prevalence are also likely to have contributed to variations in overall case mortality, as they have been found to be meaningful predictors of severity in Covid-19 patients [16].

Beyond demographic information, the three countries also exhibit significant differences in healthcare workforce, infrastructure, and functionality in their respective healthcare systems (Table 2). The unique nature of each country's healthcare landscape, heavily conditioned by the respective governance and population characteristics, is a significant constraint that shapes the available policy actions and priorities of their respective governments, and this became very clear over the course of the Covid-19 pandemic. France, Belgium and Canada all offer universal health insurance to their citizens, but there is significant variation in the services covered, and Canada's system in particular stands apart from those in Belgium and France because of the impact of the early 2000s SARS pandemic and the subsequent reorganization of some of its structures [17].

Covid-19 trends

This section presents a selection of data related to the Covid-19 pandemic in France, Belgium, and Canada from the beginning of the pandemic until early August. Due to the constantly evolving nature of the pandemic, authorities in France, Belgium and Canada adapted and changed their data reporting standards over time, and this inconsistent approach to information management is important to examine before considering the official Covid-19 figures themselves.

Table 2
Healthcare System Overviews for France, Belgium and Canada Prior to Covid-19 Outbreak.

	France [5]	Belgium [9]	Canada [5]
Healthcare Financing Scheme	Mandatory social health insurance system funded through both general and earmarked taxation.	Bismarck-style mandatory health insurance provided through six private not-for-profit insurers and one public sickness fund. [6]	Beveridge-style universal health insurance, funded through general taxation.
Healthcare Spending per Capita (€)	3 626 (11.3% of GDP) [9]	3 554 (10.3% of GDP)	4 361 (10.57% of GDP) [10]
Healthcare Governance Structure [5,6,9]	Healthcare provision is a national responsibility. The central government provides regulation and engages in negotiation with providers and insurers, with a small delegated role for regional health authorities.	Regulation of compulsory health insurance and hospitals falls under the responsibility of the federal authorities. Federal entities are responsible for financing hospital investment.	Provinces and territories have primary responsibility for organizing, funding and delivering healthcare services, with a small regulatory and financial role for the central government.
Public/Private Division in Acute (Hospital) Care System	Two-thirds of hospital beds are in government or non-profit facilities, with the remaining third privately owned. Hospital physicians are salaried, and the hospital reimbursement system is based on diagnosis related groups (DRGs).	The vast majority of hospitals are publicly funded. They are independent units or part of a larger organization that get funding from the public health service	Hospitals are mostly public or non-profit facilities, depending on the province. Global budgets remain dominant, with a few provinces using case-based payment.
Primary and Community Care System	Most GPs (68%) and specialists (51%) work as self-employed sole practitioners. The majority of the population has a GP as a gatekeeper, but a small proportion select a specialist to take on this role.	Individuals are free to consult any GP or specialist that they choose. Primary care doctors are mainly self-employed in private practice and paid fee-for-service.	GPs are mainly self-employed in private practices, and act as gatekeepers to specialized care.
Pharmacy and Prescription Medication System	Private, dispensing-based contracts plus other services, traditionally done in general practice including dispensing certain drugs without prescription if link maintained to usual doctor	Pharmaceuticals dispensed out of hospitals represents a large share of out of pocket spending. Pharmacists receive a margin of 31 percent on the sale of drugs, up to a ceiling.	Medications are generally not covered under the universal insurance, and most individuals have to pay out of pocket unless they have supplementary private insurance through an employer
Long-term Care	SHI covers medical costs for long-term care, but not housing costs. Private sector share of facilities is at 18% and has been rising steadily	There is substantial public funding for long-term care, which is assigned based on dependency level [18]	Systems vary widely between provinces and regions, but generally long-term care facilities are mostly private and are not considered insured services
Mental Health Care	Care from GPs and psychiatrists in private practice is covered by SHI, with all other types of treatments paid out of pocket or through supplementary insurance	The national government funds care within hospitals, while the federal entities are responsible for outpatient care, resulting in a variety of coverages across the country	Only mental health care provided by a physician is covered under universal insurance scheme, with psychologist/counselling services paid for out-of-pocket or through private insurance
Public Health System	The national public health institution (Santé Publique) sets national health strategy and directs regional health agencies to implement their chosen measures.	Public health and prevention programs are a collaborative effort by federal entities, with the Federal Public Service for Health, Food Chain Safety and Environment at the centre	Health Canada and the Public Health Agency of Canada provide guidance at the national level, but provinces and local health units are responsible for implementing public health measures
Number of physicians (GP/Specialist) per 1000 inhabitants	1.52 GP: 1.85 Specialist [19]	1.9 GP: 1.79 [20]	1.15 GP: 1.13 Specialist [5]
Number of nurses per 1000 inhabitants	10.8 [13]	9.4 [20]	11.67 [21]
Hospital beds per 100.000 inhabitants	647.72 [22]	622.87 [22]	270 [10]
Intensive Care Unit (ICU) beds per 100.000 inhabitants	10.75 (70% equipped with ventilators) [23]	13.16 [24]	8.56 (13.46 ventilators) [25]

Overview of data availability and data transparency

In France, Santé Publique France (SPF), the centralized national agency for public health, published an official dashboard with detailed epidemiological statistics in early March, and detailed epidemiological data about region, age, gender and case severity was routinely published by the French government starting on March 18th [26]. By the end of May, SPF was publishing highly detailed weekly reports for each region and providing national-level daily updates on key statistics such as case numbers, hospitalizations, and deaths. Notably, France began to distinguish between deaths in long term care homes and deaths in hospitals on April 2nd, a step many other countries had not taken [26].

To improve transparency, France relied on its institutional mechanisms and laws related to the “open data policy”, which allowed government actors to quickly move towards publishing public data and administrative documents without legal hurdles [27]. The open data policy also allowed for hospital data to be made accessible during the Covid-19 crisis starting from the 27th of March, although this was done within the context of the “state of health emergency” that was declared on March 22nd [27]. Despite the advantages afforded by this policy, France still faced time lags of 7–11 days before confirming data received from regional authorities, and even greater delays have occurred, including one caused by a cyber attack on Marseille’s city hall which led to a vast underestimation of Covid-19 deaths in the Bouches-de-Rhône region over the last two weeks of March [26].

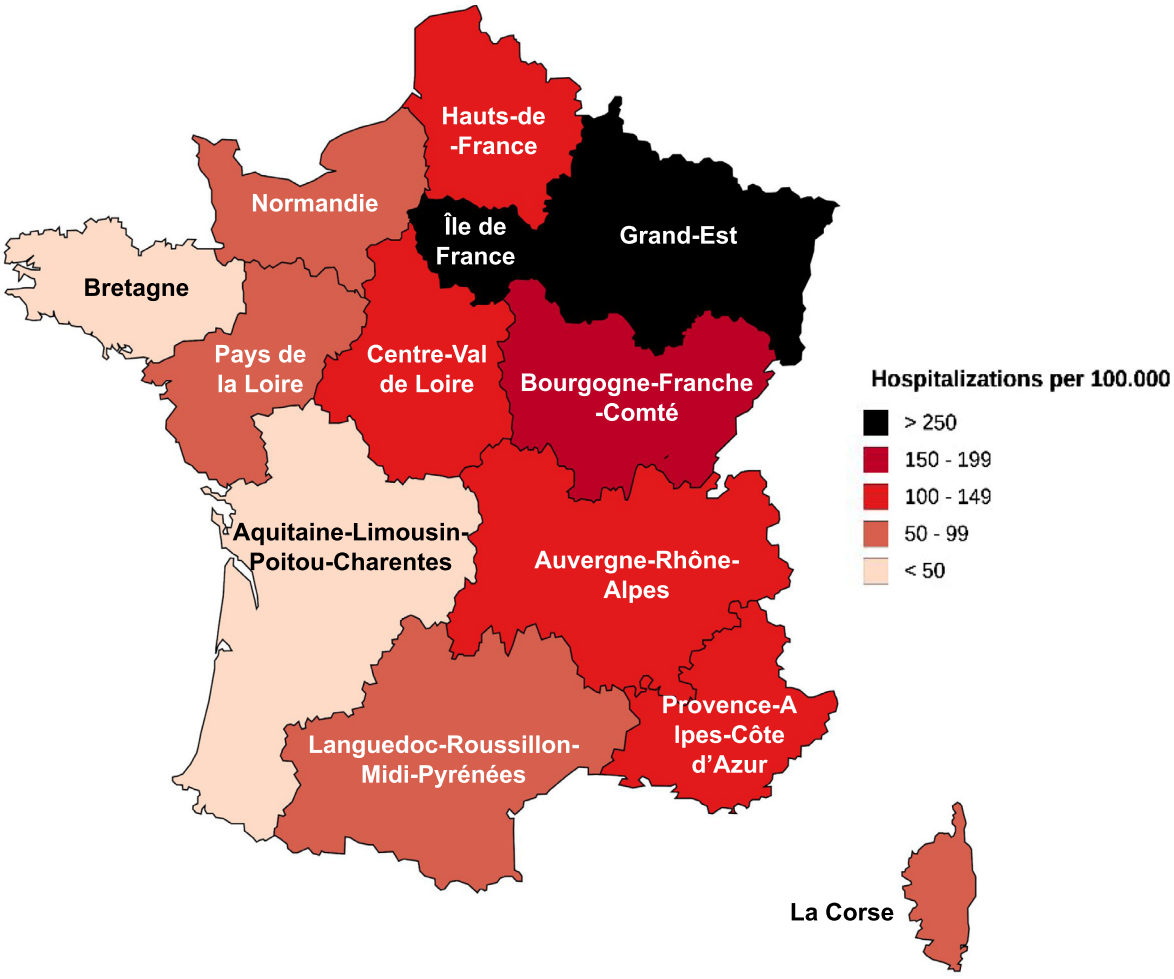

Fig. 1. Heat map showing the regional distribution of Covid-19 hospitalizations in France (As of 09/08) (France did not report number of cases by region) [26].

Sciensano, the Belgian Institute for Health, played a similarly central role to SPF in terms of data collection. Sciensano also set up an online dashboard that reported progressively more detailed case information, and the Belgian government took an even broader approach to reporting Covid-19 cases and deaths. Starting on March 31st, Belgium began to report confirmed and suspected Covid-19 deaths that occurred both in and out of hospital as part of its official death statistics [27]. This reporting standard may have contributed to Belgium having the highest case-fatality ratio (16.3%) and mortality rate per 100 000 (80.65) people in the world as of the beginning of June [28]. Despite concerns from the domestic tourism industry about these data reporting choices on the country's global brand, the government remained committed to the comprehensive counting methods, and even included suspected cases in long term care homes in the official case count, although the detailed epidemiological data continued to suffer from considerable reporting lag [27,29].

In sharp contrast to Belgium and France, information management efforts in Canada were severely hampered by the relative weakness of the federal government's public health apparatus compared to their provincial counterparts. The federal government did publish the requisite online dashboard with basic statistics such as case numbers and deaths, but national-level epidemiological data remained heavily affected by time lag with almost no improvement until late June. On May 25th, for example, Canada had 85 679 confirmed cases of Covid-19, but the federal government had complete data on only 40 660 [30]. Much of the national ineffectiveness in data reporting can be tied to the autonomy of the provinces; the federal government was reliant on provincial health authorities to report data and federal agencies historically have limited public health competency [5].

At the provincial level, government data was much more reliable, although there were large differences between provinces. While some provinces with relatively high case numbers made consistent efforts to improve data availability, the hardest hit province of Québec only began to publish official data in May after receiving pressure from academics who orchestrated a campaign for more information to help guide public policy [31]. This delay was exacerbated by the standing policy of l'Institut de la Statistique du Québec (ISQ) which prevented official verification of mortality data until 24 months after a death, greatly challenging the province's ability to operate based on up-to-date figures [31].

The spread of the pandemic in France, Belgium and Canada

In France (Fig. 1), Covid-19 cases were confirmed as early as December 27th [32], but the source of the primary outbreak was traced back to a large religious gathering in Mulhouse in the region of Grand-Est between the 17–24th of February, which brought people in from all over the country who then returned to spread the virus to their respective regions [33]. From that point on, Grand-Est and neighbouring Île de France (Paris and surrounding areas) became the epicentres of the pandemic in France.

In Canada (Fig. 2), the major outbreaks in the largest provinces also began in early March and were predominantly traced back to the United States [34]. The vast majority of the initial spread in

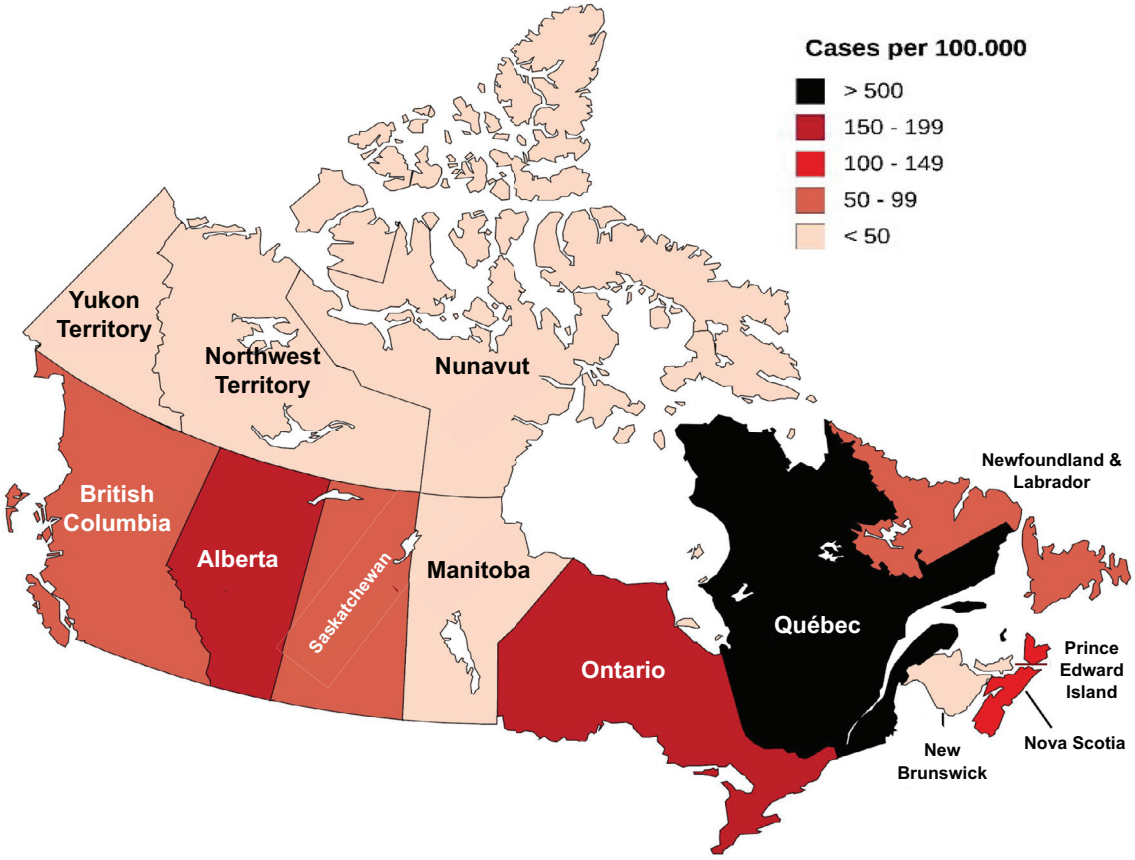

Fig. 2. Heat map showing the regional distribution of Covid-19 cases in Canada (as of 09/08) [31].

each province has been traced to travellers from the U.S., although in Québec a significant amount also arrived from France [34]. Despite a substantial amount of government rhetoric being directed towards the danger of travellers from China, these same travellers accounted for zero cases in Québec, one in Alberta, and only five in Ontario [34].

Belgium (Fig. 3) also saw a sharp rise in cases throughout the month of March, but unlike in Canada and France the origins of their widespread outbreaks are less clear. Despite the French-speaking region of Wallonia having a shared border and close economic ties with the Grand-Est region of France, the spread and severity of infection across Belgium affected several Dutch-speaking provinces in Flanders most acutely. This can partially be explained by more widespread testing in Flanders, but it also indicates that community-based transmission likely played a greater role than transmission by regional travellers [27].

Covid-19 data from France, Belgium and Canada

In France and Belgium, and indeed across most of Europe, the number of new Covid-19 cases spiked dramatically between the middle of March and the middle of April before progressively subsiding into early June (Fig. 4). In Canada, the peak of the pandemic occurred somewhat later, largely driven by a major outbreak in Québec and a smaller but still significant outbreak in Ontario, which together accounted for over 95% of the country's total deaths from Covid-19. In contrast, the next largest province of British Columbia (B.C.) was able to efficiently hinder transmission [30]. Due to Canada having a drastically larger sovereign area and greater policy differences between provinces, these three most populous Canadian provinces are included in the analysis in addition to national data when possible in order to provide a more complete account of the experience of the country as a whole.

Despite differences between provinces, the number of new cases across Canada had been largely stabilized at a low rate by mid-June, following the same trend as France and Belgium. However, after the countries began to gradually ease pandemic restrictions and re-open their economies, all three experienced a resurgence in new cases. While in Canada this growth did not reach the rapid pace of new infections seen during the initial outbreak, the situation was more concerning in France, which was seeing a significant growth in daily new cases by early August. The situation in Belgium was even worse and there was a much larger spike in new cases beginning in the middle of July that continued to grow at a pace well above that of the other two countries, leading to concerns that new measures would need to be implemented to prevent a large second wave of the pandemic [27].

This resurgence in cases in France and Belgium was not accompanied by the same levels of concern seen during March and April, however, as the resulting impact on healthcare systems appeared to be less dramatic, possibly due to earlier increases to ICU capacity (Fig. 5). These capacity increases were implemented out of necessity when cases peaked in the two countries and their respective healthcare systems began to show signs of strain. In France, the four most affected regions (Île-de-France, Grand-Est, Auvergne-Rhône-Alpes, Hauts-de-France) accounted for 74% of all Covid-19 ICU patients nationwide. Many of the hospitals in these regions were overwhelmed, in some instances forcing healthcare workers to make rationing decisions regarding the distribution of necessary care [38]. In some instances, the government was required to mobilize the military to evacuate some of these patients to less af-

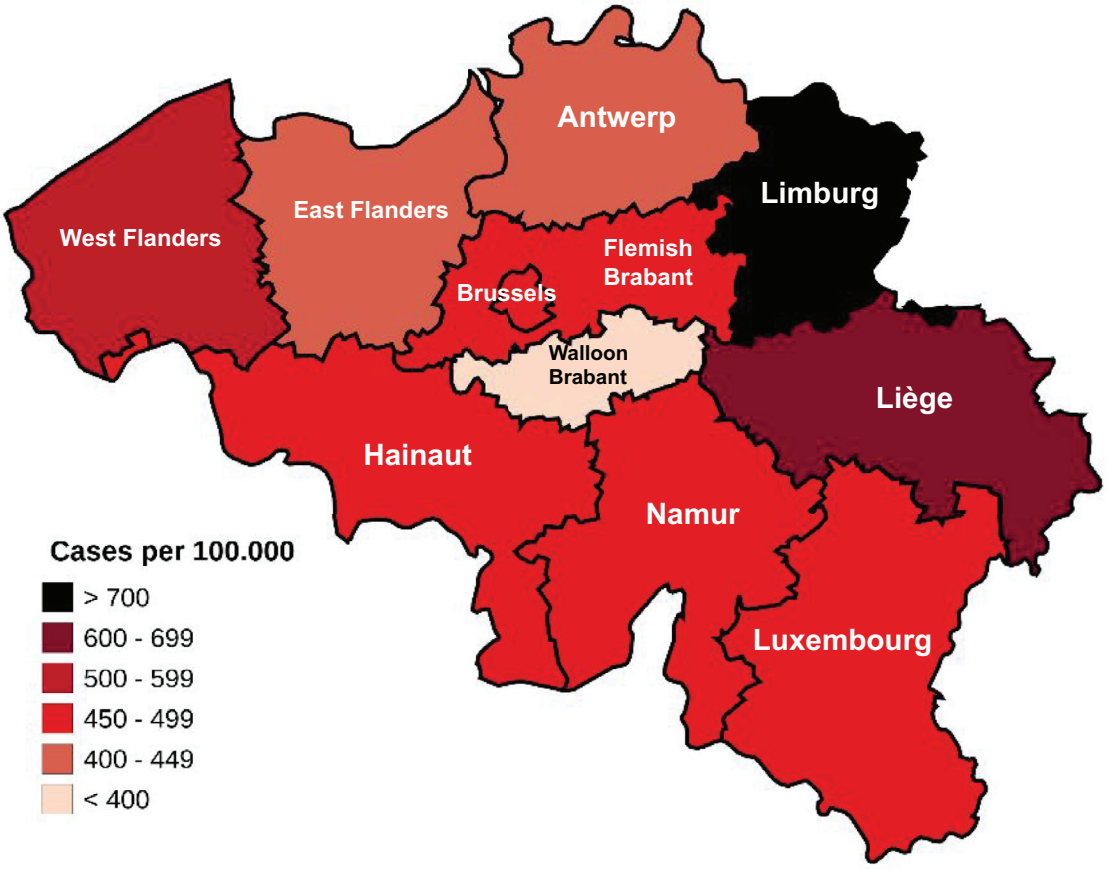

Fig. 3. Heat map showing the regional distribution of Covid-19 cases in Belgium (As of 09/08) [27].

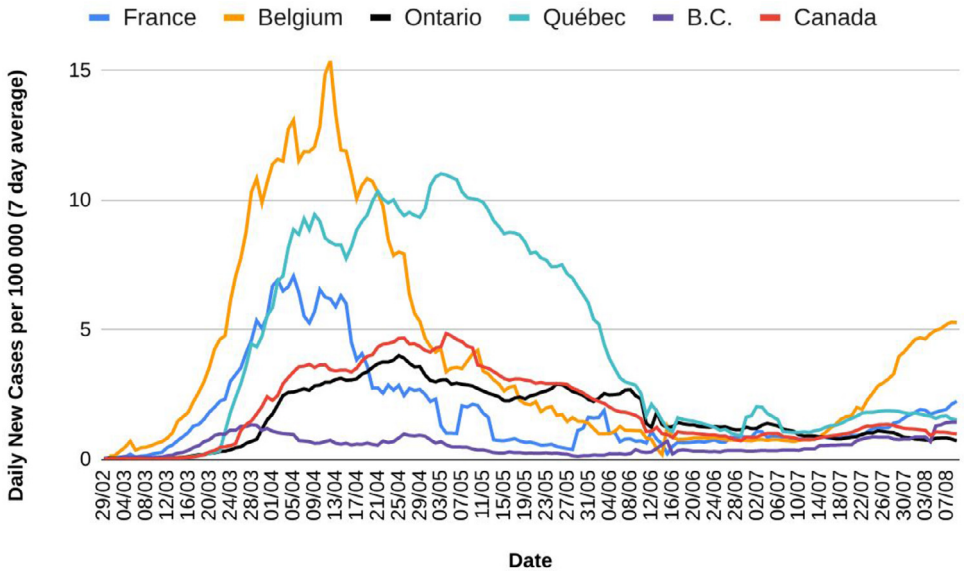

Fig. 4. Comparison of the trends of new daily Covid-19 cases (per 100 000 population) across France, Belgium, Ontario, Québec, B.C. and Canada (7 day rolling Average) [26,27,35–37].

fected regions within the country or even to send some by air to Germany and Switzerland [39].

ICU capacity was not as strained in Canada, but management of the pandemic response was far less centralized which inhibited the same type of inter-regional cooperation seen in the French health care system [30]. Ontario's ICU capacity was not seriously challenged throughout the pandemic, while neighbouring Québec grappled with a peak of 20% capacity use that only began to subside in mid-July, with some hospitals in the Montréal region experiencing even more acute spikes in demand [35,36]. As of early Au-

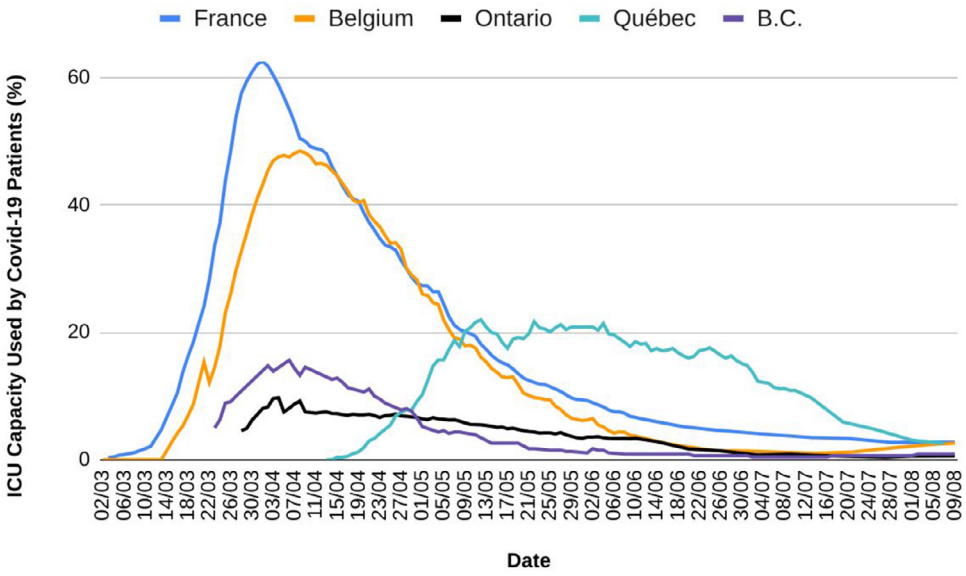

Fig. 5. Trends in total ICU capacity used by Covid-19 patients in France, Belgium, Ontario, Québec and British Columbia (B.C.) (including increases to capacity over time; national-level data for Canada is not available) [26,27,35,36,37].

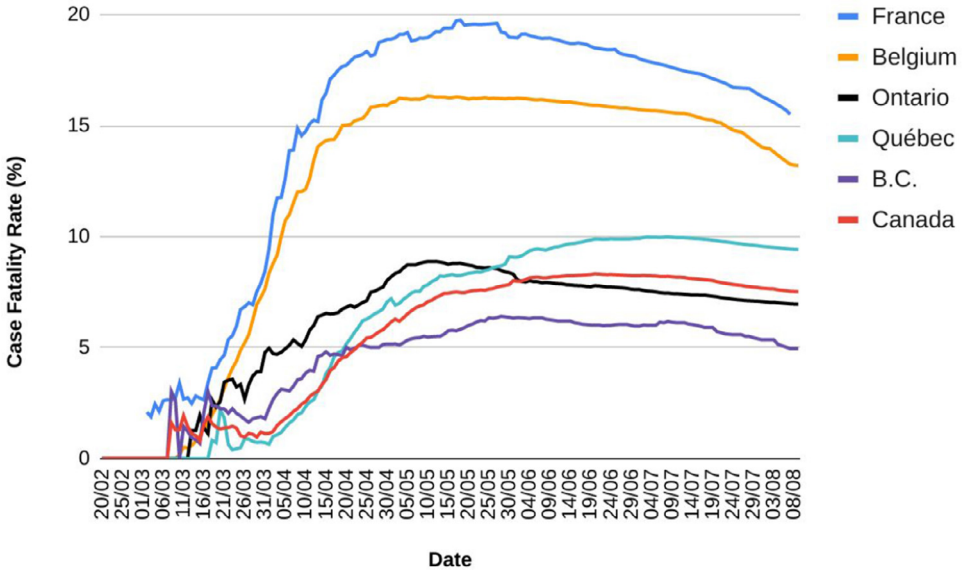

Fig. 6. Trends in case fatality rate for all Covid-19 cases in France, Belgium, Ontario, Québec, B.C. and Canada [26,27,35–37].

gust, however, the use of ICU capacity for Covid-19 patients across Canada, including in Québec, had dropped to their lowest levels since May and appeared to be stabilized.

As ICU usage began to increase, the case fatality rate trends in France and Belgium began to rise as well (Fig. 6). However, a comparison of this same trend across Ontario and Québec appears to highlight conflicting information, as they have highly similar rates despite more than twice as much strain being placed on Québec's intensive care system. An analysis of population mortality rates from Covid-19 demonstrates that case fatality rates can be misleading, as these figures are influenced by a variety of different factors (Fig. 7). Testing strategies, data reporting and affected demographics within Belgium and Québec pushed their case fatality rates lower than that of France, despite their higher actual population mortality rates.

In addition to differences in testing, epidemiological and socioeconomic elements also influenced the impact of the pandemic across the three countries. As was the case in most of the world, the most severe impacts of Covid-19 in France, Belgium and Canada were distributed disproportionately amongst older populations, with over 90% of total deaths due to the virus occurring in people over 65 years of age even though these same populations accounted for less than half of total cases [26,27,30]. Age was also not the only serious risk factor for mortality across the three countries as over 70% of hospitalized cases had one or more pre-existing comorbidities, most commonly hypertension and other cardiovascular diseases, diabetes, and obesity [27,30,40].

The three countries also largely followed global trends in terms of the disproportionate fatality rate of the virus amongst men (Fig. 8), although the experience in Canada was more nuanced because of the significantly larger female populations within Canada's hard-hit long-term care homes, where over 82% of fatalities occurred [41]. While men were more likely to die from Covid-19,

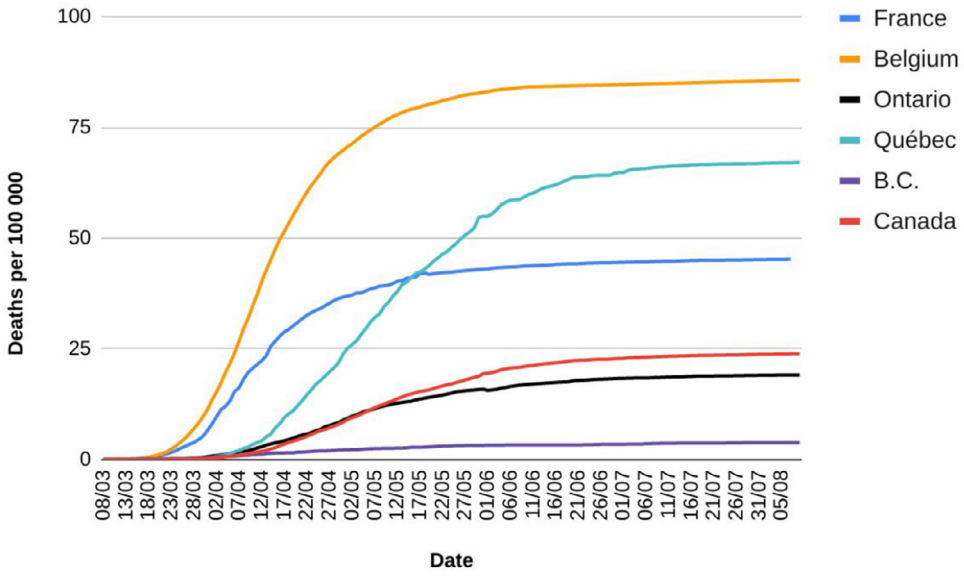

Fig. 7. Cumulative mortality trends per 100 000 population in France, Belgium, Ontario, Québec, B.C. and Canada [26,27,30,35,36,37].

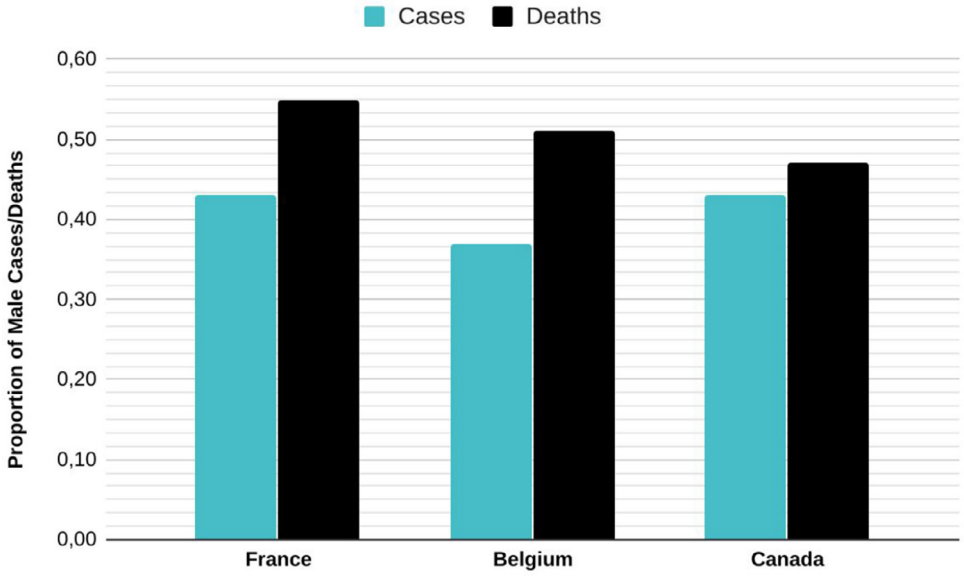

Fig. 8. Proportion of Covid-19 cases and deaths affecting males in France, Belgium and Canada [26,27,30].

women in all three countries were more likely to contract it, driven in part by unequal gender distribution in the health workforce. Figures from France and Canada show that workers in female-dominated professions such as nursing and personal support care were three times more likely to test positive for the virus compared to doctors [21,40].

Socioeconomic factors likely also played a large role in shaping the specific impacts of the pandemic, but the vast majority of healthcare providers in Canada and Belgium do not routinely collect data on sociodemographic variables beyond age and gender, and doing so in France is completely prohibited [21,42]. There is however ample suggestive evidence that poverty and ethnic minority status are correlated with worse health outcomes related to Covid-19. The poorest department in mainland France, Seine St. Denis, reported higher mortality than any other French department, while fatality rates in cities like Brussels and Montréal were also substantially higher in more impoverished neighbourhoods [26,27,36].

Policy and technology road map

The scope of policy actions taken in France, Belgium and Canada in response to the Covid-19 pandemic is incredibly broad, with each country employing widely varying individual policies and recommendations across all sectors of society. This section presents the most salient of these actions for comparison across the three countries. To simplify the interpretation of the figures in this section, a policy categorization scheme is employed using three levels of severity: Minimal (recommendations by the government, not mandated by law [blue text]); Medium (mandated by law, no enforced punishment measures [orange text]); and Significant (mandated by law with enforced punishment [red text]) [43].

In France, the government was relatively complacent as the first cases were counted and only implemented severe measures once infections began to rapidly rise (Fig. 9). Initially, most actions taken came in the form of recommendations for safe practices to slow the spread of the virus, but in many cases these were

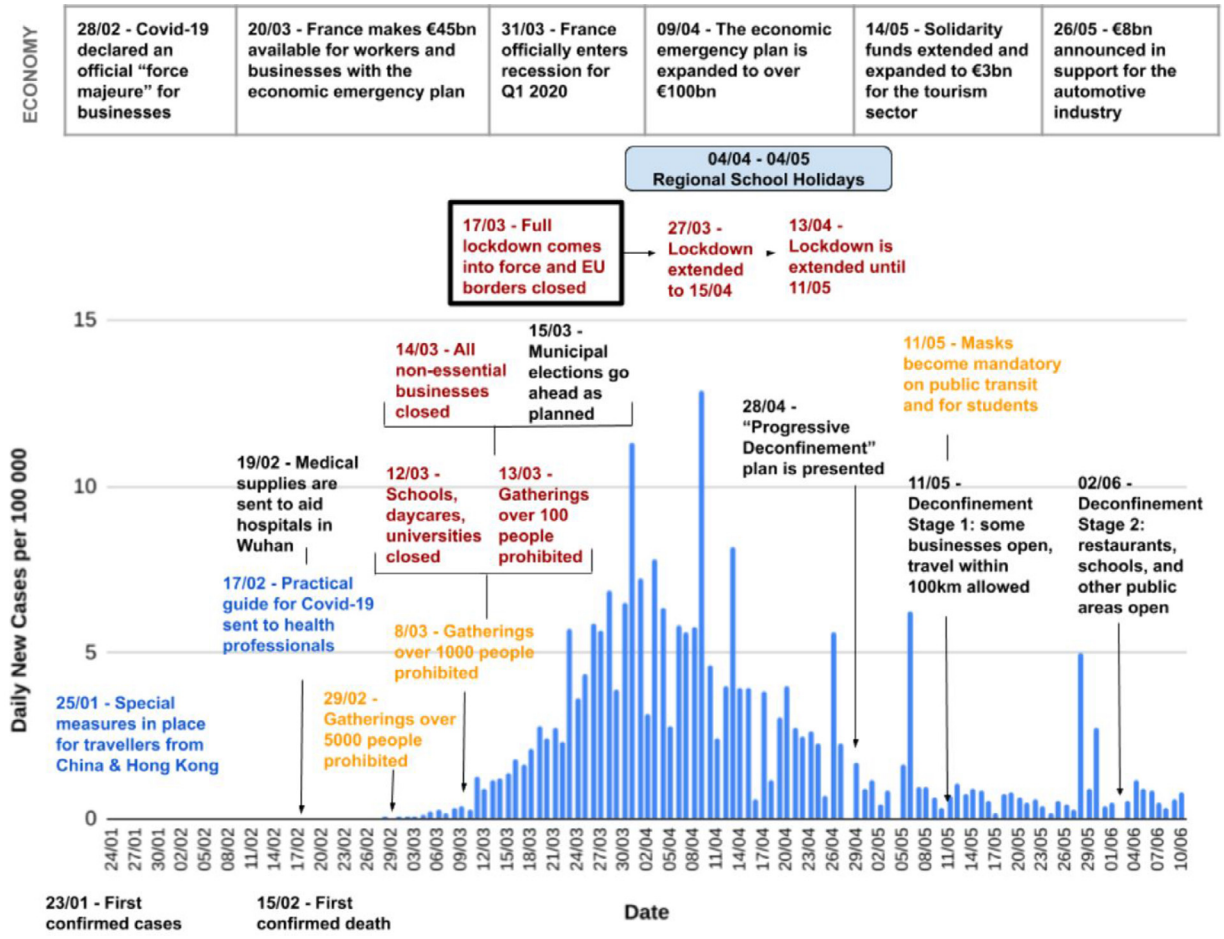

Fig. 9. Timeline of economic and virus containment policies in France contrasted with trends in daily new Covid-19 cases per 100 000 (Minimal, Medium, Severe, Uncategorized) [26].

largely ignored. This led to a hardening of government action between March 10th and March 17th, when France went from relatively light restrictions on daily life to complete lockdown, with tens of thousands of police officers patrolling streets and issuing fines of up to €135 to people who did not have a written declaration to justify their reasons for being out of their homes [26].

In stark contradiction with the implementation of more severe restrictions, the government decided to allow municipal elections to proceed as scheduled starting on March 15th, with minimal changes to voting procedures aside from priority lines for vulnerable people and recommendations to maintain safe distances from others [44]. This uneven policy approach also extended to border control, with France initially issuing a loose recommendation to arriving travellers to self-isolate for 14 days upon arrival, followed by a complete closure of their borders to non-essential travellers alongside the lockdown measures of March 17th, and may have resulted in confusion amongst citizens about the severity of the disease [26].

Government actions in Belgium followed a similar trajectory, with increasingly more severe policies implemented as case numbers began to spike, culminating in a complete lockdown on March 17th prohibiting travel and forcing the closure of non-essential businesses (Fig. 10). These measures represented a notable departure from the announcements made by the central government on March 12th, which explicitly stated that an "Italian-style" lockdown was not part of the foreseen containment strategy. This change in direction was partially caused by demands for stricter measures from various regional authorities, which share public health competencies with the central government and thus have significant influence within Belgium's system of governance [45].

Belgium also experienced a higher burden of per capita cases for its smaller population. This is partially explained by their more extensive testing and information management strategies, but it was also likely influenced by the timing of their national school holidays, which fell just as the outbreak was beginning to establish itself around Europe. Many of the early confirmed cases in the country were traced to travellers who had returned from northern Italy, and the country's case counts rose dramatically following the end of the holidays [27]. The same pattern with school holidays is also visible in the infection trends in Québec (Fig. 11), with many of their early cases being traced back to travellers who had visited the United States [46].

These shared patterns did not extend to the governance and the management of the crisis, however. While Belgium employed a shared competency approach between the central and regional governments, in Canada the policy response was much more clearly delineated, with the federal government managing economic and border control policies while the provinces were responsible for most of the public health efforts. This led to provinces placing social restrictions along different timelines and using different measures, although their actions all generally followed the rising curve of new infections and grew more severe as case numbers increased. Larger differences between provincial actions became apparent as governments moved to ease restrictions; B.C. was able to begin economic re-opening in mid-May due to their relative success in containing the virus, while Ontario and

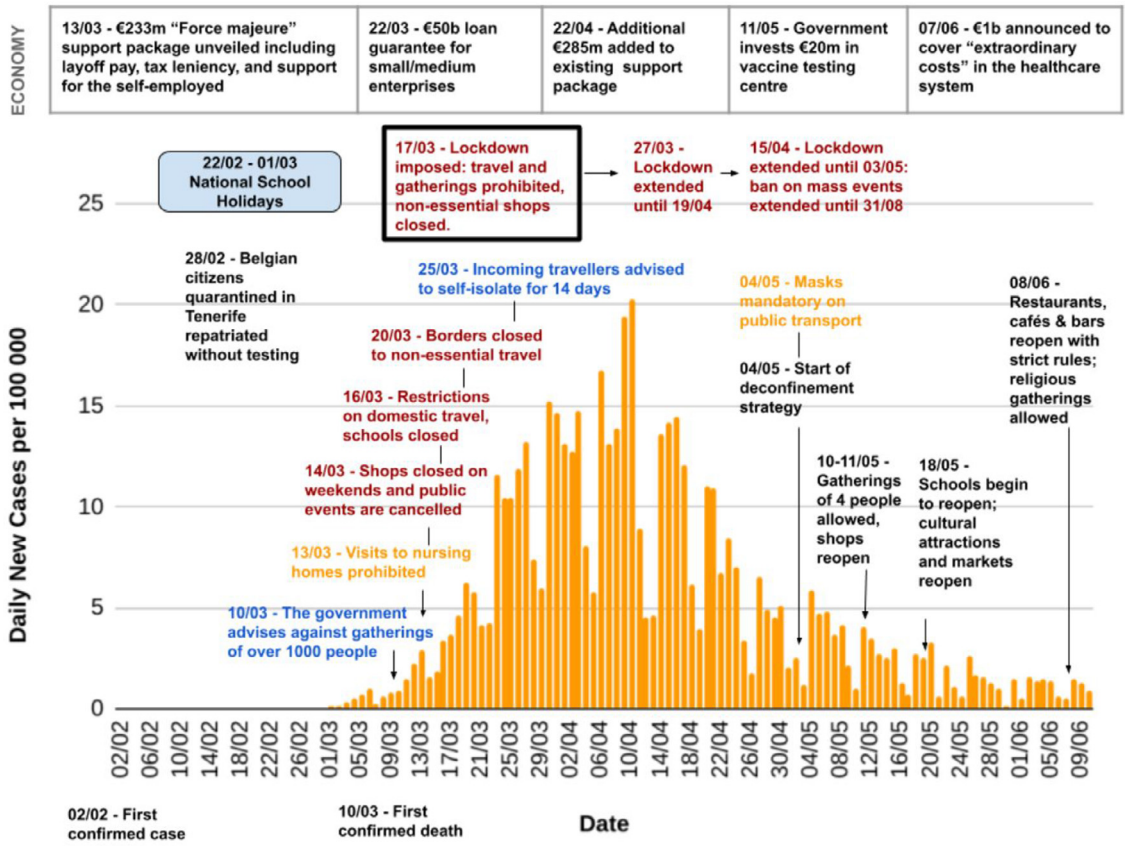

Fig. 10. Timeline of economic and virus containment policies in Belgium contrasted with trends in daily new Covid-19 cases per 100 000 (Minimal, Medium, Severe, Uncategorized) [27].

Québec struggled to implement decisive re-opening policies because they continued to battle regional outbreaks and new cases in long-term care facilities well into June [35,36,37].

While the provinces worked to contain community transmission, the federal government implemented gradually more severe border control measures, and the province of Québec unilaterally enforced inter-provincial border closures, eventually leading to heavy restrictions on travellers from all countries and a mandatory 14-day quarantine for all arrivals. [47]. These measures initially exempted the United States, but this may have been a costly decision, as the majority of Canadian Covid-19 cases brought in by travellers originated in the U.S. On May 22nd, five days after the borders were closed to other nationalities, the border with the U.S. was closed amidst heavy political pressure due to surging American case numbers and low public faith in American leadership [48].

The challenge of economic re-*opening*

Although France, Belgium, and Canada had all reduced their numbers of new cases by mid-June and were beginning to begin an easing of restrictions and a return to economic activity, they approached re-opening in a different way. The governments in France and Belgium had largely maintained mandatory mask policies for indoor public spaces and messaging campaigns to promote physical distancing but also quickly moved to allow the opening of bars and restaurants and progressively larger social gatherings [26,27]. Even as case numbers began to rise again in late July, new containment measures remained in the consideration stage only, with strong political hesitancy to cause any further economic damage. One considered measure was the reinstating of border controls in an attempt to slow down this growth in new cases, but considerable questions remained about the danger that this resurgence would pose to health and the economy moving forwards [26,27].

The Canadian federal and provincial governments, on the other hand, proceeded much more cautiously with re-opening measures by continuing strict mandatory quarantines for returning travelers and border controls [30]. In tandem, the provinces continued to enforce tight regulations on social gatherings with heavy fines [35,36,37]. The strictness of these ongoing restrictions compared to the approach to re-opening in France and Belgium may be a critical reason why Canada did not see the same rise in cases as the other two countries following a return to economic activity, although further research will be required once the full scope of this "second wave" of the pandemic can be understood [30]. It is also possible that Canada may still experience a similar rise in cases, as their initial pandemic peak occurred later than those in Europe, meaning that a possible second wave was merely delayed rather than prevented.

Despite the obvious differences in their policy actions, it can be argued that the resurgence in new cases was less of concern because these countries were now better equipped to manage a potential second wave of the pandemic; France, Belgium and Canada all maintained their earlier increases to ICU capacity while also dramatically increasing their testing rates (Fig. 12, next section). All three countries also experienced growing success with their attempts to expand contact tracing, with higher numbers of private businesses playing a role and more capacity being built into manual contact tracing systems [26,27,30].

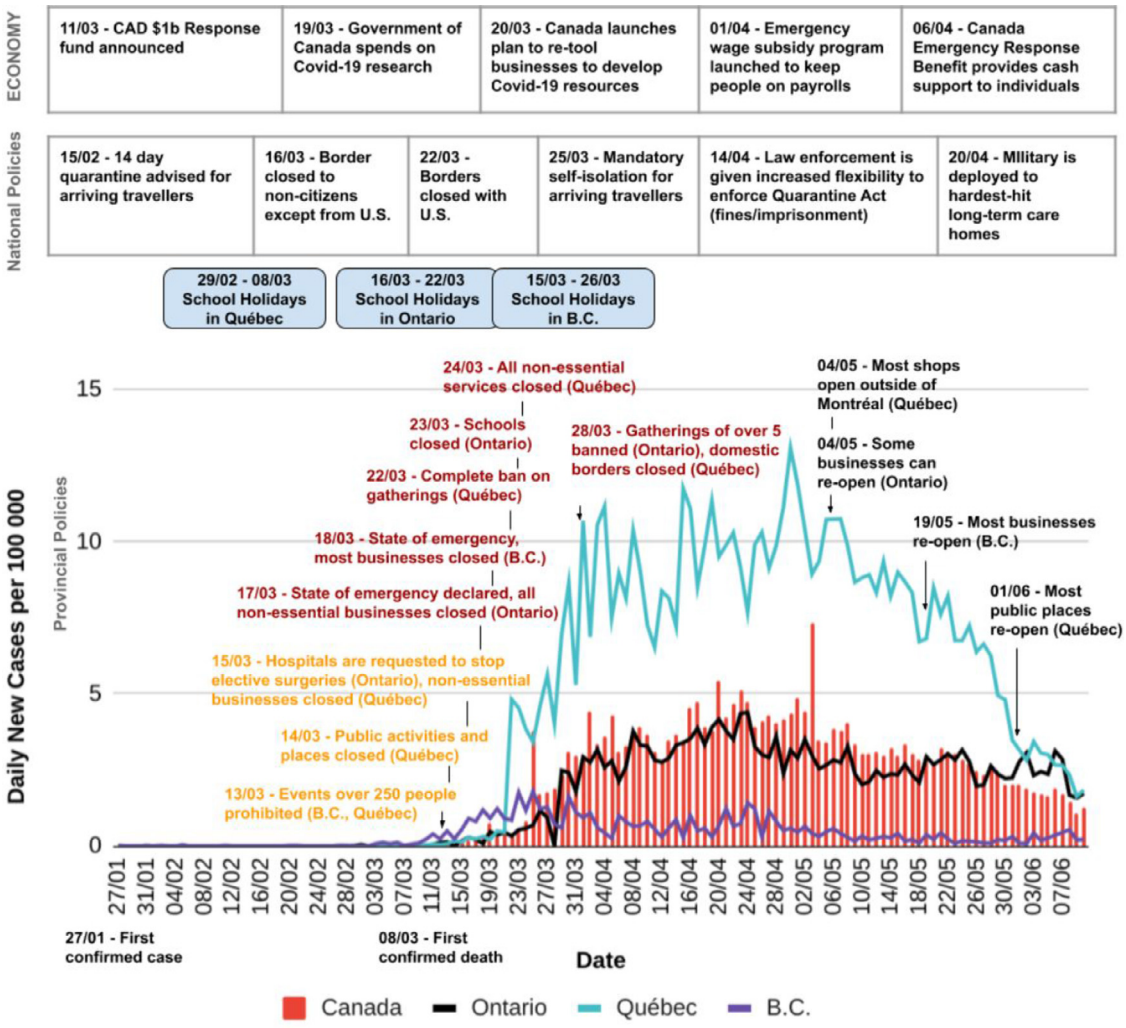

Fig. 11. Timeline of economic and virus containment policies in Canada contrasted with trends in daily new Covid-19 cases per 100 000 (Minimal, Medium, Severe, Uncategorized) [30,35,36,37].

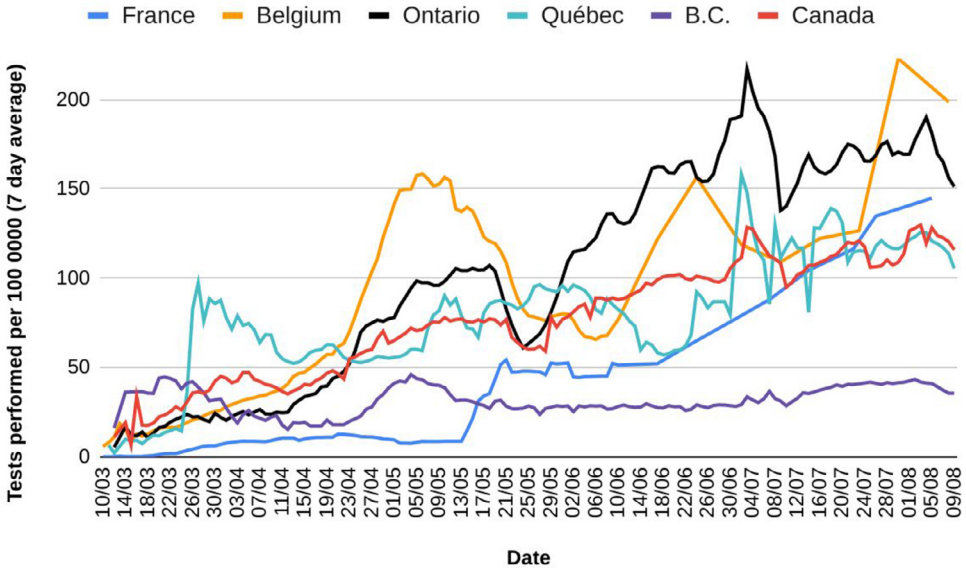

Fig. 12. Trends in the number of daily Covid-19 tests performed in France, Belgium, Ontario, Québec, B.C. and Canada (7 day rolling average) [26,27,30,35,36,37].

Testing and technology

Several technological tools have been developed during the COVID-19 pandemic (Table 3) and much of the ability for governments in France, Belgium and Canada to apply effective policy interventions relied upon effective testing strategies to provide them with accurate information [16]. These strategies also continue to dictate policy-makers' abilities to institute evidence-based approaches to easing restrictions and restarting economic activity, as they serve as the foundation for other technological approaches to ongoing containment such as contact tracing. Both physical testing capacities and data aggregation are essential components of an efficient strategy, but each country had a different approach to realizing these components.

In Canada, the implementation of testing procedures varied significantly between provinces, particularly at the outset of the pandemic. Initially, the national microbiology lab was the only entity with the capacity to test samples for Covid-19 and all of suspected cases had to be sent there, greatly delaying any reliable information about case numbers [30]. Most provinces quickly built their own testing abilities; Québec implemented aggressive testing early, while Ontario gradually broadened testing availability over time.

In France, testing was conducted at a higher rate than shown in Fig. 12, but there was discord within the government regarding the reporting of testing data, and testing was limited only to suspected cases. Tests were being conducted by hospitals, laboratories and even veterinary clinics across both the public and private sectors, and the government struggled to aggregate the information from all of these sources [49]. These difficulties led directly to the launch of the secure SI-DEP platform on May 13th which allowed all test providers to directly upload their results to a unified database. This system of sharing health data was supported by special temporary legislation allowing its operation for up to six months after the state of emergency was declared to be over [26].

In Belgium, the government faced intense criticism over its stringent testing policies early in the pandemic, but gradually increased capacity throughout March and eventually reached the highest level of testing out of the three countries by early August [50]. Testing in Belgium was also given a substantial boost on April 21st, when the government expanded testing availability to anyone with flu-like symptoms, which dramatically increased the number of tests being conducted across the country [27].

Healthcare system response

As Covid-19 began to spread, policymakers found that their flexibility to respond was largely dictated by the capacity of their healthcare systems to manage a surge in cases. Beyond the implementation of novel technologies and new testing strategies, the healthcare systems in France, Belgium and Canada were also forced to adapt to the demands of the Covid-19 pandemic at a structural level (Table 4). Repurposing of existing beds, equipment and labour resources was necessary to support critical patients in some of the most affected areas, but through the process of making these adjustments, some critical lessons were learned about the capacity of these healthcare systems moving forward.

In the case of France, for example, the Ségur de la Santé working group was formed by government actors and stakeholders from across the country with the objective of applying the experiences gained through the pandemic to a redesign of the French healthcare system [19]. In Canada, the most obvious vulnerability was the long-term care sector, which in some cases required assistance from the military to manage virus outbreaks, leading to investigations exposing existing structural problems such as labour issues causing substandard levels of care [35]. It is too early to determine whether or not these lessons will have a lasting impact in the long term, but they do appear to have fostered a desire for changes to healthcare delivery in the aftermath of the pandemic.

Economic overview

In France, Belgium and Canada, health and social care are components of the national macroeconomy, with deep linkages between sectors due to the publicly-funded nature of their social welfare systems. This interdependence across other national (and international) economic components means that policy responses to a pandemic must also be viewed within a broader context. The link between policies aimed at ameliorating the health impact of Covid-19 and policies aimed at addressing the economic fallout of the virus highlights the essential role of health (and social) care systems and health outcomes to the rest of the macroeconomy (Table 5).

Canada, France and Belgium have relatively similar gross domestic products (GDP) per capita, yet France is the most reliant on hard hit sectors such as tourism and automotive industry. When income inequality is considered, Canada has the greatest level of inequality (GINI coefficient) which is confirmed by the high proportion of households earning less than half the median income in the country [61]. Belgium has the highest GDP per capita using Purchasing Power Parity (PPP) and the lowest levels of inequality and households with low incomes.

The IMF predicted that in 2020, Canada's GDP will be least affected by Covid-19 and France's the most, suggesting that if the economic impacts follow the same socioeconomic trends as the spread of the virus itself, inequalities in France are set to increase the most [61]. Falling revenues from taxation and increased spending due to the pandemic will mean increasing deficits and each country forecasts a significant increase in government debt [61]. It remains too early to determine with certainty all of the long-term economic consequences of the pandemic, but the IMF projections appear to be accurate in the short term, as all three countries confirmed GDP losses for the first quarter of 2020 compared to the previous quarter: 5.8% in France, 3.9% in Belgium, and 2.6% in Canada [13].

Falling household expenditure and contracting GDP are likely to further increase government debt as tax income falls, especially because low consumer confidence about the future of the economy is a feature of each country. McKinsey reported 90% of those surveyed in Belgium and France were negative or unsure about the future prospects of the economy. The figure in Canada was 80%, although this is set against a background of the highest household debt to GDP of the three countries [62]. There is little to suggest that in any country a consumer led recovery will reverse GDP declines. Monetary policy in Europe has little to offer to policy makers, as the key interest rate was already at zero. Canada, where a large proportion of household debt is backed by real estate was able to make a monetary policy response by cutting the key interest rate. However debt leveraged against real estate when prices move downwards due to macroeconomic factors is unlikely to increase household confidence.

Economic policy responses

As France, Belgium and Canada implemented severe restrictions on daily life in an effort to limit the spread of the virus, it became clear that these restrictions would have a large negative impact on their respective economies. Concerns about economic health drove their governments to pass unprecedented financial support packages to support individuals and businesses. Economic concerns were also the main drivers behind reopening strategies as govern-

Table 3
Overview of technology implemented in response to Covid-19 in France, Belgium and Canada.

Health Technology (Announcement or use of Health Technology)	Contact Tracing	France	The Stop-Covid mobile app was released on June 1st after heated debates about data privacy. The app uses Bluetooth technology and its use is completely voluntary. Users will be warned if they have crossed paths with someone who has tested positive for Covid-19 in the two previous weeks. One week after its launch, 1.4 million people had downloaded it, representing only 2% of the population[51].
		Belgium	Belgium started its contact tracing trials on the 4th of May as part of their exit strategy, but refused to commit to an app-based approach until an announcement in early June that they would work to develop such an app by September. In the meantime, 2000 contact tracers were hired to perform manual contact tracing from call centers, which are operated by regional governments. The government in Brussels set aside €10m for contact tracing, with these measures expected to remain in place for one full year [52].
		Canada	In an effort to implement nationwide contact tracing, the federal government created the Canadian Digital Service, which developed an app based on Bluetooth technology provided by Apple and Google. The government has emphasized that the app is voluntary but recommended as many people download it to improve effectiveness. The app was first piloted in Ontario on July 2 before being released nationwide. Complicating matters, some provinces had already launched their own apps, such as ABTrace in Alberta, which was activated on May 1st. This created concern for a fragmentation of contact tracing networks across the country that could damage their effectiveness [53].
	Healthcare Delivery and Prevention of Covid-19 infections	France	*Healthcare delivery*: Some existing 3D printers were re-purposed to create masks and non-invasive ventilators [54]. *Healthcare delivery*: The government relaxed the conditions for carrying out telemedicine acts until April 30th. Doctolib, the largest provider of telemedicine services, delivered over 100 000 teleconsultations per day while confinement measures were active, 100 times more than before the pandemic [26]. *Prevention*: The Pasteur Institute has set up a "covid-score" website where individuals can calculate their risk of getting severe complications or dying from Covid-19, based on statistics around risk factors such as age, size, weight, and sex. This website was launched on the 11th of May to support phase one of deconfinement [55]. *Healthcare delivery*: The telepresence robot "Pepper" was used in a Paris ICU in an attempt to keep patients connected to their social networks and prevent mental health issues [56].
		Belgium	*Healthcare delivery*: On April 1st, Belgium started reimbursement for teleconsultations related to COVID-19. Under this measure, physicians were allowed to give out medical advice over the phone to help patients who were potentially infected with Covid-19 and to ensure continuity of care for patients with chronic diseases who faced increased risks in leaving their homes [20].
		Canada	*Prevention:* The federal government released the "Canada COVID-19 App and Daily Symptom Tracker" alongside an online self-assessment tool in an attempt to provide official information to citizens regarding pandemic policy measures and healthcare options. *Prevention:* The ArriveCAN app was developed to pre-screen arriving travellers and create a more contactless border security process [30]. *Healthcare Delivery:* Prior to the pandemic, telemedicine represented just 0.15% of all medical services delivered in Canada, due to billing models that paid more for physical visits. B.C. responded by making digital health services billable at the same rate as physical appointments, but in other provinces there has been little support for a shift to telemedicine [35–37].
	Covid-19 Treatment	France	The state recommended to suspected Covid-19 patients to use video-call consultations to get diagnosed and monitored at home in order to avoid risks of transmission and burdening of healthcare service. Patients with other pathologies were also encouraged to get treated remotely [26]. Remote monitoring also involved patients with confirmed or suspected Covid-19 receiving a secure link to a self-assessment questionnaire every day through the Covidom app, with follow-up calls from physicians if their state of health worsened [57].
		Belgium	A consortium of 7 Belgian medtech companies developed the "Covid-19 smart patch" to remotely monitor respiration, heart rate, and temperature of Covid-19 patients [58].
		Canada	Health Canada approved over 43 clinical trials for Covid-19 treatments (as of 10/06), including multiple for the controversial drug hydroxychloroquine. Novel chest x-ray technology that bypasses radiologist assessment requirements was also sped through the approval process for new medical devices in the hopes of obtaining faster Covid-19 diagnoses. A "DNA testing cube" the size of a coffee cup was developed by Canadian startups and can process Covid-19 tests in under an hour, and the federal government agreed to a procurement contract of 14000 per month [30].

Table 4
Adaptations to the healthcare systems in France, Belgium and Canada caused by the 2020 Covid-19 pandemic.

Sector	France	Belgium	Canada
Healthcare workforce	Under the ORSAN emergency plan, the government mobilized the health workforce through four main methods: reorganisation of working staff, increased volunteer capacity, the 'health reserve' of retired and student health professionals that could be mobilized as required, and the requisition of new staff wherever possible [19].	The Health Minister signed a royal decree on May 4th to temporarily allow some non-nurse workers to take on duties normally done by qualified nurses. The decree was labelled a "declaration of war" by healthcare professionals, leading to inconsistent application [20].	Provinces generally applied the same types of strategies to optimize their health workforces. In Ontario, Québec and B.C., nurses and specialists were redeployed from surgical units into medical ones as required once elective surgeries were put on hold, based largely on regional needs [35,36,37]. Ontario also restructured some nursing positions in order to add 1300 phone lines to the provincial telehealth hotline [35].
Acute (Hospital) Care	The ORSAN plan also called for re-organization of hospital care. The plan specifically states that hospitalization must occur only for emergency situations, and requires all establishments, including private ones, to postpone certain non-essential interventions, "open" additional beds and reinforce their workforce [26]. Despite the increased capacity under ORSAN, the military was deployed to assist the healthcare system by moving patients from high-demand hospitals to ones with more available capacity, including some in Switzerland and Germany [26].	Starting on March 14th, emergency departments were divided in two to accommodate Covid-19 patients and non-Covid-19 patients, requiring additional infrastructure, labour and equipment [20]. On March 22nd, the health minister announced that 759 new ICU beds would be added as part of the national emergency plan [20]. On March 30th, a plan was designed to redistribute patients across hospitals in the most affected regions to reduce stress on the highest-demand facilities [59].	Ontario was able to increase ICU capacity by ~90% throughout the month of April by repurposing beds, and B.C. was also able to boost their ICU capacity using the same methods. Québec did not have the same flexibility in resources and struggled to improve their capacity. However, all provinces enacted some level of hiatus on elective procedures to further relieve stress on their healthcare systems. [35,36,37]. Data on system use by non-Covid patients is not often publically available, but a large drop in average hospital wait times during the pandemic may indicate that people were not seeking care as they normally would [35].
Mental Health	On March 22nd, Santé Publique France launched a population wide survey called "CoviPrev" to monitor the behaviours and mental health of French citizens during the pandemic. Despite generally reduced access to mental health care during the crisis, early data from the survey suggests that there are no significant changes to the prevalence of mental health issues [26].	Prior to the pandemic, Belgium completed a major shift in mental health care systems away from hospitals and towards better-equipped community-based care. Despite this, Sciensano conducted a survey of 44 000 respondents and found that depressive disorders increased from 10% in 2018 to a rate of 16% (as of May 5th). The prevalence of depression also tripled in young women (30%) and quadrupled in young men (29%) [27].	To address concerns about the effect of social restrictions on mental health, the government of Canada launched the "Wellness Together Canada" online portal. This provided digital access to numerous mental healthcare options either through hotlines or text messages, and available mental health practitioners were incentivized to participate [30]. B.C. and Québec implemented similar solutions, including a Covid-19 psychological hotline and specific supports for healthcare workers [36,37].
Finance	The government passed an "exceptional" health spending policy of €7b, notably to finance €4b in new equipment and to supplement the salaries of healthcare workers. As part of this package, the government agreed to cover 50% of the costs of any personal protective equipment (PPE) purchased by regional authorities starting on April 28th, to support safe deconfinement [26]. Moving forward, the government has also started a process of rethinking the healthcare system under the "Ségur de la Santé" commission. As of June 10th, this includes €12b in increased funding for public hospitals [19].	Belgium implemented a raft of policies to financially support the healthcare sector. Lump sum payments were directed to hospitals, user fees were removed from alll telehealth and digital health services, and free access to care was temporarily extended to undocumented migrants. Citizens who were self-employed were allowed to request a deferral of health insurance contributions [20]. Taxation was also leveraged as a conduit for aid, with the government removing taxes from any donations of medical equipment. [6]	The government of Canada made health research funding a priority during the pandemic, approving 99 research grants totalling $275 m to develop medical countermeasures against Covid-19 and future pandemics [30]. Increases to funding for health care systems primarily came from the provincial level. Ontario created a dedicated CAD $1b Covid-19 contingency fund for additional health care investments, alongside a contingency fund of CAD $1.3 billion to provide flexibility to changing global circumstances moving forward. [35] Meanwhile, Québec funnelled an additional CAD $133 m into their embattled long-term care facilities. [36]
Long-term care	Residents in long-term care facilities (EHPAD) accounted for over 50% of all Covid-19 deaths in France, despite a ban on visitors and mandatory PPE requirements being put in place. This led the government to retain many of the restrictive measures within EHPAD facilities even after the rest of society entered the first phases of deconfinement. Family visits of up to 2 people with masks were allowed again on May 11th, but many activities for residents remained limited and admissions of new residents were greatly delayed, leading to increased home care burdens [19].	Residents in long-term care facilities accounted for over 30% of Covid-19 deaths in Belgium. All visitors were banned on March 12th, but no distancing measures were put in place within the homes themselves, and there were multiple reports of intra-resident transmissions leading to deaths. Government PPE procurement also gave priority to hospitals, leaving staff at long-term care facilities with a lack of appropriate PPE [60].	As of May 25th, residents of long-term care facilities accounted for 81% of Canadian Covid-19 deaths. Québec and Ontario both requested and received military assistance in some of their most affected long-term care facilities [35,36]. The federal government made this assistance conditional on a full investigation by military personnel of the conditions in these facilities. The resulting reports noted aggressive treatment toward residents, cases of residents being improperly fed with poor hygienic care, and inadequate supplies of PPE [3]. These reports led to the creation of several government task forces to improve long-term care moving forward [35,36].

Table 5
Various pre and post-Covid-19 economic indicators in France, Belgium and Canada.

	France	Belgium	Canada
GINI Coefficient. OECD [13]	0.292	0.263	0.310
Proportion of households incomes below 50% of median household income. OECD [13]	0.253	0.217	0.305
IMF estimated contraction in GDP due to Covid-19 [61]	7.2%	6.9%	6.2%
Pre Covid-19 Govt. debt to GDP ratio	98.1% [26]	99.2% [63]	31% [3]
Post Covid-19 Govt. estimated debt to GDP ratio	115% [26]	115% [63]	48% [3]
Household Debt as percentage of GDP IMF 2018	60.00%	61.29%	100.68%
Consumer Confidence, pessimistic or unsure of long term consequences of COVID on economy McKinsey May 2020 [62]	89%	90%	80%
Interest rates before and after Covid-19	0%, 0%	0%, 0%	1.75%, 0.25%

ments faced increasing pressure to ease restrictions regardless of the epidemiological state of affairs.

In mid-March, France amended the national budget to include an initial €45b in support packages, which was increased to €110b (5% of GDP) in April. Some of the major features from these packages included supplementing health and credit insurance schemes, increased spending on health supplies, and tax leniency for both individuals and large organizations [61]. To reduce friction in the labour market upon a return to normal activities, a large amount of this funding also went to wage subsidies so that employees could be retained on company payrolls. Many of these measures were scheduled to be phased out starting in June, which prove to be premature as there is not enough available data related to the economic impact of the pandemic restrictions and a reliable cost-benefit analysis cannot yet be performed [61].

Despite the planned phase-out of financial aid, some sectors that were deemed critical to the economy such as the automotive industry are scheduled to receive specific assistance tied to special incentives. With this financial support, the French government mandated that certain conditions related to environmental standards be met, including the increased production of “greener” vehicles [61]. The impacts of this type of conditional aid program, which is also being applied to the German automotive industry, merits further research as the French economy begins to recover.

Similar to the situation in France, Belgium implemented a package of fiscal measures to help manage the crisis in their €10.2b (2.3% of GDP) “Stability Program”, which included many of the same key elements. Though the amount of direct government support is comparably smaller, Belgium also introduced a €51.9b loan guarantee scheme to help anchor their financial aid strategy, which was intended to help any business or household that was negatively affected by the pandemic [61]. Both Belgium and France both also agreed to provide targeted support to their tourism sectors, which are expected to continue to suffer Covid-19 related losses until at least the end of 2020.

As was the case with other policy actions taken in Canada, the federal government took certain steps to implement national-level economic policies, while the provinces were more varied in their responses. The main thrust of the federal government’s aid package was CAD $116b (5.5% of GDP) in direct aid to households and firms, including wage subsidies and increasing tax credits [61]. The most salient part of this package was the Canadian Emergency Response Benefit (CERB), which was a monthly CAD $2000 direct cash payment to individuals who were unable to work due to the pandemic. In a different approach than that taken by France, the Canadian government opted to extend the CERB for 4 months past its originally planned June phase-out date in an effort to support a faster economic recovery [30].

Although the federal government has a much larger share of governance competency related to economic matters, individual provinces also announced relief measures within their respective scope. Québec made a concerted effort to support cultural institutions through a CAD $46 m investment in the Arts Council of Québec and a CAD $10 m infusion to the circus industry and Cirque du Soleil, while Ontario and B.C. both announced broad packages with funding for their agri-food, electricity, fishing, forestry, and tourism sectors [64].

Economic impact analysis

Much more data needs to be observed and collected regarding the overall health and economic impacts of pandemic policy actions in these countries, notably with regards to mental health and long-term economic outcomes, but using the early economic data presented in this section it is possible to conduct a rudimentary economic analysis to estimate the potential costs associated with the protection of public health. Each country’s reported quarter-over-quarter GDP losses from Q1 can be used as a crude proxy for the economic costs associated with containment measures. Modelling has also been conducted to estimate the number of lives saved by these containment measures, with one study including France and Belgium (up to May 4th) [65] and another containing a projection for Canada (for all of 2020) [66] .By combining these two measurements, a basic cost per life saved figure can be calculated for each country:

- France - €191 657.68
- Belgium - €261 527.12
- Canada - €116 927.91

It should be noted that the numbers are highly speculative, as GDP cannot be taken as a perfect proxy for costs of lockdown, and estimates of lives saved were derived from imperfect statistical models and would be far more informative if life years were specified instead given the skewed distribution of mortality across age groups. Nonetheless, these figures show that Belgium paid a much higher economic price as a result of its pandemic containment measures, which is likely due in part to its less effective initial response and ensuing higher mortality rates. Future research efforts in this area should continue to focus on thorough data collection and sound methodological choices in order to deliver more accurate estimates that will be relevant to policy makers as the Covid-19 situation continues to evolve.

Conclusions and policy implications

Our analyses have highlighted key similarities and differences between the policy responses between France, Belgium and Canada during the early stages of the Covid-19 pandemic. While the difference between federal and centralized states is clear, further distinguishing between the Canadian and Belgian systems required further consideration of geographic size and population density. Overall, Belgium was the most affected by Covid-19, and policies there may have been less effective than in France of Canada. One possible explanation may be the shared responsibility between national and regional governments may have slowed down decision-making

processes, or even caused policy choices that reflected compromises between stakeholders and thus were not optimally effective. By contrast, the largely provincial decision-making in Canada has allowed certain provinces such as British Columbia to harness strong governance capacity to swiftly tackle the pandemic, while others like Quebec have struggled to flatten the curve, perhaps due in part to a more laissez-faire approach to policy-making.

In France, more centralized decision-making may have allowed for more effective coordination of healthcare resources across the country, which was aided by a more transparent and integrated data policy, again facilitated by a strong central government. This provides another contrast with Canada, where decentralized decision-making prevented widespread resource sharing between neighbouring provinces even if some had available hospital capacity, a situation that was further exacerbated by time lags in bringing the information on COVID cases back to the federal level. It should be noted that these coordination issues existed despite concentrated efforts for improvement being made in response to the earlier SARS pandemic.

While the greater centralization in France may have helped with resource coordination, it was not enough to catalyse the implementation of an effective testing strategy. Compared to its more federalist comparators, France's testing policies were delayed and soft-handed and may have hindered its overall ability to manage the pandemic. In Canada, on the other hand, being in a decentralized setting allowed some provinces to quickly build their testing capacities, even though this was primarily done to address a lack of infrastructure at a national level and may have contributed to the unequal epidemiological success across provinces.

Despite issues with testing, centralization appears to have been more effective at reacting to the early lessons learned from the Covid-19 crisis. The most emblematic example of this reactive capacity is the Ségur de la Santé: the heavy stress put on hospital capacity in France triggered a new plan to invest €12 billions in the public hospital system, including a reevaluation of healthcare worker salaries, following a consultative process that was expected to be completed during the summer of 2020. There is no comparable effort to address wider health system issues in Belgium or Canada. In fact, there is yet no clear strategic direction on the next stage in Belgium, which speaks to the difficulty of joint decision-making in a decentralized governance system.

Although a governance perspective provides many insights into the policy-making environments in these three countries during the Covid-19 pandemic, it also comes with obvious limitations. For example, the long term care sector has been severely affected both in France and in Canada, and the disproportionally heavier toll taken on this sector in Canada may be more linked to trends towards privatization rather than the degree of governance decentralization. Similarly, the impotance of national and regional culture as it relates to decision-making in healthcare could also play a role in the way Covid-19 policies were implemented and their eventual effectiveness. Further research is still needed to further understand the various impacts and responses to COVID in countries with varying degrees of centralization, including research analysing different countries, in order to uncover the impact of governance systems within the wider societal context of a pandemic.

Author Statements

Funding

None

Declaration of Competing Interest

None declared.

Ethical approval

Not required

References

[1] Green J, Edgerton J, Naftel D, Shoub K, Cranmer SJ. Elusive consensus: polarization in elite communication on the COVID-19 pandemic. Sci Adv 2020;6. eabc2717 https://doi.org/10.1126/sciadv.abc2717 .

[2] Farboodi M, Jarosch G, Shimer R. Internal and external effects of social distancing in a pandemic. Natl Bureau Econ Res 2020. https://doi.org/10.3386/w27059.

[3] Canada GA. Canada and the world. GAC 2015. https://www.international.gc.ca/world-monde/index.aspx?lang=eng&_ga=2.242799940.795622589.1589825911-185088066.1589825911 (accessed May 18, 2020).

[4] France Diplomatie - Ministère de l'Europe et des Affaires étrangères n.d. https://www.diplomatie.gouv.fr/fr/ (accessed May 18, 2020).

[5] The Commonwealth Fund: International Health Care System Profiles n.d. https://international.commonwealthfund.org/ (accessed May 18, 2020).

[6] Country Health Profiles . (accessed May 18, 2020) http://www.euro.who.int/en/about-us/partners/observatory/publications/country-health-profiles .

[7] Central Intelligence Agency. The World Factbook. https://www.cia.gov/library/publications/the-world-factbook/docs/one_page_summaries.html (accessed May 19, 2020).

[8] Institut national de la statistique et des études économiques (INSEE)Comparateur de territoire. INSEE 19 September 2019. https://www.insee.fr/fr/statistiques/1405599?geo=FRANCE-1 (accessed May 17, 2020).

[9] European Commission State of Health in the EU Country Health Profile 2019. (accessed May 17, 2020) https://ec.europa.eu/health/state/country_profiles_en .

[10] World Bank Open Data. World bank. Available from: https://data.worldbank.org/ (accessed May 17, 2020).

[11] Statbel. Nouveau léger progrès de l'espérance de vie de la population belge en 2018 [Internet]. Statbel; 18 July 2019 [cited 2020 May 17]. Available from: https://statbel.fgov.be/fr/themes/population/mortalite-et-esperance-de-vie/tables-de-mortalite-et-esperance-de-vie

[12] Eurostat. Real GDP per capita [Internet]. European Commission [updated 2020 May 13; cited 2020 May 17]. Available from: https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=sdg_08_10&plugin=1

[13] Organisation for Economic Co-operation and development (OECD) [cited 2020 May 18]. Available from: https://data.oecd.org/.

[14] World Health Organization (WHO) [Internet]. WHO Diabetes Country Profiles 2016. 2016;(April):2016. Available from: http://www.who.int/diabetes/country-profiles

[15] Government of Canada SC. Smoking, 2018 2019. https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00006-eng.htm (accessed May 18, 2020).

[16] Coronavirus COVID-19 (SARS-CoV-2) | Johns Hopkins ABX Guide n.d. https://www.hopkinsguides.com/hopkins/.//view/Johns_Hopkins_ABX_Guide/540747/all/Coronavirus_COVID_19__SARS_CoV_2_?refer=true (accessed May 18, 2020).

[17] Webster P. Canada and COVID-19: learning from SARS. The Lancet 2020;395:936–7. https://doi.org/10.1016/S0140-6736(20)30670-X.

[18] European Network of Economic Policy Research Institutes. The Belgian Long Term Care System. https://www.files.ethz.ch/isn/122382/Belgium.pdf (accessed May 18, 2020).

[19] DREES - Ministère des Solidarités et de la Santé n.d. https://drees.solidarites-sante.gouv.fr/etudes-et-statistiques/la-drees/ (accessed May 18, 2020).

[20] Health. SPF Santé Publique n.d. https://www.health.belgium.be/fr/sante (accessed May 18, 2020).

[21] Institut canadien d'information sur la santé | ICIS n.d. https://www.cihi.ca/fr (accessed June 6, 2020).

[22] World Health Organisation Europe. Total hospital beds [Internet]. European Health Information Gateway [cited 2020 May 18]. Available from: https://gateway.euro.who.int/en/hfa-explorer/#5NdH1AXiEu

[23] SNPI, Combien y a t-il d'hôpitaux en France ? n.d.

[24] Coronavirus : la fin des hôpitaux de référence n.d. https://www.lespecialiste.be/fr/actualites/socio-professionnel/coronavirus-le-chu-saint-pierre-n-rsquo-est-plus-le-seul-a-accueillir-les-patients-francophones.html (accessed May 18, 2020).

[25] Fowler RA, Abdelmalik P, Wood G, Foster D, Gibney N, Bandrauk N, et al. Critical care capacity in Canada: results of a national cross-sectional study. Crit Care 2015;19:133. https://doi.org/10.1186/s13054-015-0852-6.

[26] Info Coronavirus COVID-19. Gouvernement.fr n.d. https://www.gouvernement.fr/info-coronavirus (accessed May 26, 2020).

[27] COVID-19 - Situation épidémiologique | Coronavirus Covid-19 n.d. https://covid-19.sciensano.be/fr/covid-19-situation-epidemiologique (accessed June 1, 2020).

[28] Mortality Analyses. Johns Hopkins Coronavirus Resource Center n.d. https://coronavirus.jhu.edu/data/mortality (accessed May 26, 2020).

[29] Coronavirus: Belgium's high death toll will deter tourists. The Brussels Times 2020. https://www.brusselstimes.com/all-news/business/107423/coronavirus-belgiums-high-death-toll-will-deter-tourists/ (accessed May 26, 2020).

[30] Public Health Agency of Canada, Epidemiological summary of COVID-19 cases in Canada. AEM 2020. https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html (accessed May 26, 2020).
[31] Des chercheurs dénoncent un «manque criant de données sur la pandémie». La Presse 2020. https://www.lapresse.ca/covid-19/202004/29/01-5271461-des-chercheurs-denoncent-un-manque-criant-de-donnees-sur-la-pandemie.php (accessed May 26, 2020).
[32] Peillon L. L'origine de l'épidémie de Covid en France peut-elle remonter à l'automne 2019 ? Libération.fr 2020. https://www.liberation.fr/checknews/2020/05/21/l-origine-de-l-epidemie-de-covid-en-france-peut-elle-remonter-a-l-automne-2019_1788866 (accessed May 26, 2020).
[33] INFOGRAPHIE - Coronavirus : comment le Grand Est est devenu la région la plus touchée de France. France Bleu 2020. https://www.francebleu.fr/infos/sante-sciences/infographie-coronavirus-comment-le-grand-est-est-devenu-la-region-la-plus-touchee-de-france-1583956926 (accessed May 26, 2020).
[34] Canada's early COVID-19 cases came from the U.S. not China | Healthing.ca 2020. http://nationalpost.com/news/politics/canadas-early-covid-19-cases-came-from-the-u-s-not-china-provincial-data-shows (accessed May 26, 2020).
[35] COVID-19 (coronavirus) in Ontario. COVID-19 (Coronavirus) in Ontario n.d. https://covid-19.ontario.ca/ (accessed June 5, 2020).
[36] Données COVID-19 au Québec. INSPQ n.d. https://www.inspq.qc.ca/covid-19/donnees (accessed June 5, 2020).
[37] BC COVID-19 Data n.d. http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data (accessed June 10, 2020).
[38] Santé. L'Obs n.d. https://www.nouvelobs.com/sante/ (accessed June 5, 2020).
[39] France 24 - Infos, news & actualités - L'information internationale en direct. France 24 n.d. https://www.france24.com/fr/ (accessed June 5, 2020).
[40] Victimes du coronavirus en France : âge, région... Qui sont-elles ? n.d. https://sante.journaldesfemmes.fr/fiches-maladies/2622115-coronavirus-covid-19-victime-france-age-chiffres-comorbidites-profil-type-portrait-jeune-bilan-courbe/ (accessed June 6, 2020).
[41] NIA LONG TERM CARE COVID-19 TRACKER - iamsick n.d. https://ltc-covid19-tracker.ca/ (accessed June 6, 2020).
[42] Farkas L. Data Collection in the Field of Ethnicity. The European Commission 2017.
[43] Moy, Naomi, Antonini, Marcello, Kyhlstedt, Mattias and Paolucci, Francesco, Categorising Policy & Technology Interventions for a Pandemic: a Comparative and Conceptual Framework (June 9, 2020). Available at SSRN:https://ssrn.com/abstract=3622966
[44] French Interior Ministry. Second tour des élections municipales: des bureaux de vote adaptés. 18 June 2020. https://www.interieur.gouv.fr/Elections/Elections-municipales-2020/Second-tour-des-elections-municipales-des-bureaux-de-vote-adaptes (accessed June 6, 2020).
[45] Bouhon F, Jousten A, Miny X, Slautsky E. L'État belge face à la pandémie de Covid-19: esquisse d'un régime d'exception. Courrier hebdomadaire du CRISP 2020;1:5–56.
[46] Canada's early COVID-19 cases came from the U.S. not China | Healthing.ca 2020. http://nationalpost.com/news/politics/canadas-early-covid-19-cases-came-from-the-u-s-not-china-provincial-data-shows (accessed May 26, 2020).
[47] Apr 01 LG•CN P, April 1 2020, 9:17 AM ET | Last Updated: Gatineau police set up checkpoints to limit interprovincial traffic | CBC News. CBC n.d.https://www.cbc.ca/news/canada/ottawa/ottawa-gatineau-bridge-border-ontario-quebec-1.5517240 (accessed May 18, 2020).
[48] Association on Canadian Studies. Canadian opinion on the coronavirus. 4 May 2020. https://acs-aec.ca/wp-content/uploads/2020/05/ACS-Coronavirus-20-In-Canadians-We-Trust-May-2020.pdf (accessed June 6, 2020).
[49] Libération. Covid-19: est-il vrai que la France est incapable de compter le vrai nombre de tests pratiqués chaque jour ? 15 April 2020. https://www.liberation.fr/checknews/2020/04/15/covid-19-est-il-vrai-que-la-france-est-incapable-de-compter-le-vrai-nombre-de-tests-pratiques-chaque_1785211 (accessed May 28, 2020).
[50] Brussels Times. Belgium will begin testing people with flu symptoms for Covid-19. 21 April 2020. https://www.brusselstimes.com/all-news/belgium-all-news/107324/belgium-will-being-testing-people-with-flu-symptoms-for-covid-19/ (accessed May 28, 2020).
[51] Le Monde. L'application StopCovid, activée seulement par 2% de la population, connaît des débuts décevants. 10 June 2020. https://www.lemonde.fr/pixels/article/2020/06/10/l-application-stopcovid-connait-des-debutsdecevants_6042404_4408996.html (accessed June 11, 2020)
[52] Brussels Times. Contact tracing: brussels to start test phase on 4 May. 29 April 2020. https://www.brusselstimes.com/brussels/108845/contact-tracing-brussels-to-start-testphase-on-4-may/ (accessed June 10, 2020).
[53] CBC . Voluntary nationwide contact tracing app coming soon, says Trudeau. 18 June 2020. https://www.cbc.ca/news/politics/contact-tracing-app-1.5617121 (accessed June 12, 2020).
[54] Les Échos. Un dispositif d'aide respiratoire trois-en-un en 3D. 4 May 2020. https://www.lesechos.fr/pme-regions/innovateurs/un-dispositif-daide-respiratoire-trois-enun-en-3d-1200080 (accessed June 10, 2020).
[55] Institut Pasteur. Covid-score. N.d. http://www.covid-score.fr/
[56] La Vie. Robots à l'hôpital: "La technologie est au cœur de la bataille contre le Covid-19". 29 April 2020. http://www.lavie.fr/actualite/france/robots-a-l-hopital-la-technologieest-au-coeur-de-la-bataille-contre-le-covid-19-29-04-2020-105877_4.php (accessed June 8, 2020).
[57] La Tribune. Coronavirus: explosion des téléconsultations en France. 8 April 2020. https://www.latribune.fr/technos-medias/internet/coronavirus-explosion-desteleconsultations-en-france-doctolib-grand-gagnant-844660.html (accessed June 8, 2020).
[58] Le Spécialiste. Un "Covid-19 smart patch" pour suivre à distance 3 fonctions des patients contaminés. 23 April 2020. https://www.lespecialiste.be/fr/actualites/ehealth/covid-19-smart-patch-pour-suivre-a-distance-3-fonctions-des-patients-contamines.html (accessed June 6, 2020).
[59] Brussels Times. Where are Belgium's coronavirus cases?. 1 April 2020: https://www.brusselstimes.com/belgium/104045/where-are-belgiums-coronavirus-cases/ (accessed June 8, 2020).
[60] Voyer Benjamin G., and Lachoumy V. Cocooning does not mean abandoning: in the wake of the COVID-19 pandemic, can care homes learn from the Belgian experience?. 2020: 1–3.
[61] International Monetary Fund. Policy responses to COVID-19. n.d. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#F
[62] McKinsey & Company. Consumer sentiment is evolving as countries around the world begin to reopen. 5 June 2020. https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/a-global-view-of-how-consumer-behavior-is-changing-amid-covid-19# (accessed June 2, 2020).
[63] National Bank of Belgium. Summary of Covid-19 economic measures. n.d. https://www.nbb.be/en/summary-covid-19-economic-measures
[64] McCarthy Tetrault. COVID-19: economic relief measures announced to date. 28 June 2020. https://www.mccarthy.ca/fr/node/63761#QC (accessed June 28, 2020).
[65] Flaxman S, Mishra S, Gandy A, Unwin HJT, Mellan TA, Coupland H, et al. Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe. Nature 2020;584:257–61. https://doi.org/10.1038/s41586-020-2405-7.
[66] Ferguson Neil M, et al. Impact of Non-Pharmaceutical Interventions (NPIs) to Reduce COVID-19 Mortality and Healthcare Demand. Imperial College London March 16, 2020.